



# ROBOTICS RESOURCES

Information Resource Center, U.S. Embassy Jakarta

## Robotics



NASA will use robots like Robonaut to go on the equivalent of a human space-walk. Image Credit: NASA

### What is Robotics

Robotics is the study of robots. Robots are machines that can be used to do jobs. Some robots can do work by themselves. Other robots must always have a person telling them what to do.

### How Does NASA Use Robots?

NASA uses robots in many different ways. Robotic arms on spacecraft are used to



Canadarm2.

move very large objects in space. Spacecraft that visit other worlds are robots that can do work by themselves. People send them commands. The robots then follow those commands.

### What Are Robotic Arms?

NASA uses robotic arms to move large objects in space. The space shuttle's "Canadarm" robot arm first flew on the

shuttle's second mission in 1981. The International Space Station is home to the larger Canadarm2. The space shuttle has used its arm for many jobs. It could be used to release or recover satellites.

### How Do Robots Explore Other Worlds?

Robots help NASA explore the solar system and the universe. Spacecraft that explore other worlds, like the moon or Mars, are all robotic.

### How Does NASA Use Robotic Airplanes?

NASA uses many airplanes called UAVs. UAV stands for unmanned aerial vehicle. These planes do not carry pilots aboard them. Some UAVs are flown by remote control by pilots on the ground. Others can fly themselves, with only simple directions. UAVs provide many benefits. The planes can study dangerous places without risking human life.

### How Can Robots Help Astronauts?

NASA is developing new robots that could help people in space. For example, one of these ideas is called Robonaut. Robonaut looks like the upper body of a person.

Another robot idea is called SPHERES. These are small robots that look a

little like soccer balls. These are small robots that look a little like soccer balls. The current SPHERES are being used on

the space station to test how well they can move in microgravity.



SPHERES

NASA also is studying the possibility of other robots. For example, a small version of the station's robotic arm could be used inside the station. A robot like that might help in an emergency. If an astronaut were seriously hurt, a doctor on Earth could control the robotic arm to perform surgery. This technology could help on Earth, as well. Doctors could use their expertise to help people in remote locations.

Robots also can be used as scouts to check out new areas to be explored. Scout robots can take photographs and measure the terrain. This helps scientists and engineers make better plans for exploring. Scout robots can be used to look for dangers and to find the best places to walk, drive or stop. This helps astronauts work more safely and quickly. Having humans and robots work together makes it easier to study other worlds.

For more details please visit [http://www.nasa.gov/audience/foreducators/robotics/home/what\\_is\\_robotics\\_58.html](http://www.nasa.gov/audience/foreducators/robotics/home/what_is_robotics_58.html)



Robonaut

---

## Robotics -- Related Sites

### **Canadarm2 and the Mobile Servicing System (Grades 5-Adult)**

This robotic system plays a key role in space station assembly and maintenance: moving equipment and supplies around the station, supporting astronauts working in space, and servicing instruments and other payloads attached to the space station.

Link [http://www.nasa.gov/mission\\_pages/station/structure/elements/mss.html](http://www.nasa.gov/mission_pages/station/structure/elements/mss.html)

### **From the Lab to the Moon (Grades 5-Adult)**

Beginning in 1959, robotic pioneers voyaged from Earth to the moon. They provided scientists and engineers with vital data about the lunar environment. Their flybys, impacts and soft touchdowns gave NASA the confidence needed to proceed with human exploration of Earth's nearest neighbor.

Link <http://www.nasa.gov/externalflash/apollo40jpl/>

### **Jet Propulsion Laboratory's Robotics Program (Grades 5-Adult)**

Find detailed descriptions of the activities of the Mobility and Robotic Systems section, as well as related robotics efforts taking place at the Jet Propulsion Laboratory in California.

Link <http://www-robotics.jpl.nasa.gov/index.cfm>

### **Mars Exploration Program (All Ages)**

The site has past, present and future Mars mission information. It contains

Mars facts, images, photo journals, spacecraft animation and the latest news on Mars exploration activities.

Link <http://mars.jpl.nasa.gov/>

### **NASA and GM Take Giant Leap in Robotic Technology (Grades 8-Adult)**

Meet Robonaut 2, or R2. NASA and General Motors worked together to build this new humanoid robot capable of working side by side with people.

Link <http://www.nasa.gov/topics/technology/features/robonaut.html>

### **New Millennium Program (All Ages)**

The NMP provides a critical bridge from initial concept to exploration-mission use. Through NMP, selected technologies are demonstrated in the "laboratory" of space that can't be replicated on Earth.

Link <http://nmp.jpl.nasa.gov/>

### **The Robotic Exploration of Space (All Ages)**

This timeline summarizes the history of robotic exploration, which has paved the way for humans in space.

Link <http://sse.jpl.nasa.gov/>

### **Robonaut (Grades 5-Adult)**

Robonaut is a humanoid robot that can function as an extravehicular activity astronaut. This Web site describes Robonaut's mechanisms, avionics and computational architecture.

Link <http://robonaut.jsc.nasa.gov/>

### **Robotic Lunar Lander (All Ages)**

A NASA team is building the next generation of robotic landers.

Link <http://www.nasa.gov/centers/marshall/news/robotics/>

### **Robotics Alliance Project (Grades 4-Adult)**

The Robotics Alliance Project actively supports three national robotics competitions: Best Robotics, Botball Robotics and the FIRST Robotics Competition. The Robotics Alliance Project houses a clearinghouse of robotics-related educational materials.

Link <http://robotics.nasa.gov/>

### **Robot Storybook (Grades K-4)**

What would you do if you had a robot? Find out what one is before you decide! People Are Robots, Too.

Link <http://www.nasa.gov/audience/forstudents/k-4/stories/ames-robots-storybook.html>

### **Technology at NASA's Jet Propulsion Laboratory (Grades 5-Adult)**

At NASA's lead center for creating robotic spacecraft and rovers, JPL engineers build smart machines that can perform very complicated tasks while millions of miles from home.

Link <http://technology.jpl.nasa.gov/>

**Source:** <http://www.nasa.gov/audience/foreducators/robotics/relatedsites/index.html>

---

Compiled by Information Resource Center, Public Affairs Section, U.S. Embassy Jakarta

If you would like to know more about United States, do not hesitate to contact us at:

Phone: 021-350-8567 | Fax.: 021-350-8466 | Email: [ircjakarta@state.gov](mailto:ircjakarta@state.gov)

Website: <http://jakarta.usembassy.gov>

---